

Chronic Wasting Disease

Chronic wasting disease (CWD) is a transmissible spongiform encephalopathy (TSE) of deer and elk. To date, this disease has been found only in cervids (members of the deer family). First recognized as a clinical "wasting" syndrome in 1967 in mule deer in a wildlife research facility in northern Colorado, it was identified as a TSE in 1978. CWD is typified by chronic weight loss leading to death. There is no known relationship between CWD and any other TSE of animals or people.

In the mid-1980s, CWD was detected in free-ranging deer and elk in contiguous portions of north-eastern Colorado and southeastern Wyoming. In May 2001, CWD was also found in free-ranging deer in the southwestern corner of Nebraska (adjacent to Colorado and Wyoming) and later in additional areas in western Nebraska. The limited area of northern Colorado, southern Wyoming, and western Nebraska in which free-ranging deer and/or elk positive for CWD have been found is referred to as the endemic area. Soon after diagnosis of the disease as a TSE, Colorado and Wyoming wildlife management agencies stopped the movement of deer and elk from their research facilities; wild cervids have not been translocated from the endemic area. In 2002, CWD also has been detected in wild deer in south-central Wisconsin, southwestern South Dakota, the western slope of Colorado, southern New Mexico, and northern Illinois.

CWD also has been diagnosed in farmed elk and deer herds in a number of States and in two Canadian provinces. The first positive farmed elk herd in the United States was detected in 1997 in South Dakota.

Since then, 25 additional positive elk herds and two positive farmed deer herds have been found: South Dakota (7), Nebraska (4), Colorado (10), Oklahoma (1), Kansas (1), Minnesota (1), Montana (1), and Wisconsin (2). As of October 2002, three of these 27 positive herds remain under State quarantine. Twenty-three of the herds have been depopulated or have been slaughtered and tested, and the quarantine has been lifted from one herd that underwent rigorous surveillance with no further evidence of disease. CWD also has been found in farmed elk in the Canadian provinces of Saskatchewan and Alberta and in free-ranging mule deer in Saskatchewan. For more information on CWD in

Canada, visit the Canadian Food Inspection Agency Web site at www.inspection.gc.ca/english/animal/heasan/dise-mala/cwdmdce.shtml.

Species that have been affected with CWD include Rocky Mountain elk, mule deer, white-tailed deer, and black-tailed deer. Other ruminant species, including wild ruminants and domestic cattle, sheep, and goats, have been housed in wildlife facilities in direct or indirect contact with CWD-affected deer and elk with no evidence of disease transmission. There is ongoing research to further explore the possibility of transmission of CWD to other species.

Causative Agent

The agent responsible for CWD (and other animal TSEs, such as scrapie and bovine spongiform encephalopathy) has not been completely characterized. There are three main theories on the nature of the agent that causes CWD: (1) the agent is a prion, an abnormal form of a normal protein, known as cellular prion protein, most commonly found in the central nervous system. The abnormal prion protein "infects" the host animal by promoting conversion of normal cellular prion protein to the abnormal form; (2) the agent is an unconventional virus; (3) the agent is a virino, or "incomplete" virus composed of nucleic acid protected by host proteins. The CWD agent is smaller than most viral particles and does not evoke any detectable immune response or inflammatory reaction in the host animal. Based on experience with other TSE agents, the CWD agent is assumed to be resistant to enzymes and chemicals that normally break down proteins, as well as resistant to heat and normal disinfection procedures.

Clinical Signs

Most cases of CWD occur in adult animals. The disease is progressive and always fatal. The most obvious and consistent clinical sign of CWD is weight loss over time. Behavioral changes also occur in the majority of cases, including decreased interactions with other animals, listlessness, lowering of the head, blank facial expression, and repetitive walking in set patterns. In elk, behavioral changes may also include hyperexcitability and nervousness. Affected animals continue to eat grain but may show decreased interest in hay. Excessive salivation and grinding of the teeth also are observed. Most deer show increased drinking and urination.

Diagnosis

Research is being conducted to develop live-animal diagnostic tests for CWD. Currently, definitive diagnosis is based on postmortem examination (necropsy) and testing. Gross lesions seen at necropsy reflect the clinical signs of CWD, primarily emaciation. Aspiration pneumonia, which may be the actual cause of death, also is a common finding in animals affected with CWD. On microscopic examination, lesions of CWD in the central nervous system resemble those of other TSEs. In addition, scientists use a technique called immunohistochemistry to test brain tissue for the presence of the abnormal prion protein to diagnose CWD.

Epidemiology

The origin and mode of transmission of CWD is unknown. Animals born in captivity and those born in the wild have been affected with the disease. Based on epidemiology, transmission of CWD is thought to be lateral or from animal to animal; although maternal transmission may occur, it appears to be relatively unimportant in maintaining epidemics.

Surveillance

Surveillance for CWD in free-ranging deer and elk in Colorado and Wyoming has been ongoing since 1983 and has helped define the core endemic areas for the disease in those States. CWD in free-ranging deer in Nebraska was detected in 2000/2001; more intensive surveillance to better define the prevalence and distribution of the disease in free-ranging deer in Nebraska is underway. In addition, an extensive nationwide surveillance effort was started in 1997-98 to better define the geographic distribution of CWD in free-ranging cervids in the United States. This surveillance effort is a two-pronged approach consisting of hunter-harvest cervid surveys conducted in many States, as well as surveillance throughout the entire country targeting deer and elk exhibiting clinical signs suggestive of CWD. Over 15,000 harvested free-ranging deer and elk have been tested to date, including over 13,000 animals harvested from outside of the endemic area. The recent finding of CWD in wild deer in areas far removed from the known endemic area has resulted in the development of plans for intensive surveillance in the 2002-2003 hunting season to better define distribution of the disease in wildlife in the United States.

Surveillance for CWD in farmed elk began in 1997 and has been a cooperative effort involving State agriculture and wildlife agencies and the U.S. Department of Agriculture's (USDA) Animal and Plant Health Inspection Service (APHIS). Farmed cervid surveillance has been increasing each year since 1997 and will be an integral part of the USDA program to eliminate CWD from farmed elk.

Management

In each State where CWD has been detected in wildlife, State wildlife agencies have enacted response and/or management plans. APHIS has provided assistance to State officials in diagnosing CWD and in monitoring international and interstate movements of animals to help prevent further spread of CWD. Also, APHIS is developing a program to eliminate CWD from farmed elk. In addition, many State animal health regulatory agencies have instituted CWD programs for farmed elk. All of these agencies are committed to limiting the distribution of the disease in free-ranging deer and elk to the current localized area and decreasing its occurrence in both the free-ranging and farmed deer and elk populations.

National CWD Program

In May 2002, Congress requested that USDA and the Department of Interior develop a plan to assist State wildlife management and agriculture agencies with CWD management. A CWD task force was formed to ensure that Federal and State agencies cooperate in the development and implementation of an effective national CWD program. The task force delivered the Plan for Assisting States, Federal Agencies, and Tribes in Managing Chronic Wasting Disease in Wild and Captive Cervids to Congress in June 2002 and is currently developing an implementation document for the plan. The plan addresses CWD diagnostics, communication, information dissemination, management, research, and surveillance. For more information about the plan and the task force, visit the following Web site:
<http://www.aphis.usda.gov/oa/cwd/newsoper.html>.

Additional Information

For more information from APHIS about CWD in farmed cervids, contact:

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Current information on animal diseases and suspected outbreaks is also available on the Internet at <http://www.aphis.usda.gov>.

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